

VIII. *Notes on Indian Ants.* By GEORGE ALEXANDER  
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[Read March 6th, 1895.]

THE following notes refer to species collected during a three months' tour in India, from October 27th, 1893, to January 27th, 1894, and include an account of short visits to Bombay, Poona, Madras, Bangalore, Mysore, Calicut, Cochin, Travancore, Madura, Calcutta, Barrackpore, Delhi, Lahore, Bhavnagar, and Baroda.

I am deeply indebted to Dr. Forel for his wonderful patience in examining a vast number of specimens, the majority being small, uninteresting species, very difficult to determine, and the amount of valuable time spent in naming the collection, leaves me quite overwhelmed by his great courtesy and kindness. The tour was a rapid one, and the season of the year, for Bengal and Upper India, unfavourable for collecting; still, considering the extent of the ground covered and that many of the localities were probably new to the ant collector, the result in novelties (some five species and varieties) was disappointing, and speaks highly for the thorough and exhaustive manner in which Mr. R. C. Wroughton, the author of "Our Ants," has worked the Indian fauna, and also confirms, as Dr. Forel remarked on returning the collection, "The marked uniformity of the species of the continent of India." To make the most of the limited time available, I concentrated my attention to the following points:—

1. To find a ♀ *Dorylus*, or *Lobopelta*.
2. To sound produced by ants, or stridulating ants.
3. To the length of residence or attachment of a species to a particular spot, as illustrated by the existence, in 1893-94, of certain nests or colonies which had been well known to me between the years 1872-1886.

In No. 1, I failed altogether; in No. 2, though particularly favoured by many opportunities of observation,

the evidence was, unfortunately, of a negative character ; in No. 3, in two instances at least, I met with success.

*Camponotus compressus*, Fab.,

was found at every locality visited, and is more generally distributed and in evidence than any other ant, only taking a second place in those localities frequented by *Myrmecocystus viaticus*, or where *S. armata* and *M. salomonis* are specially abundant.

*Polyrhachis lævissima*, Smith.

My favourite nest of this ant in Barrackpore Park, which flourished between 1872–1886 (Trans. Ent. Soc. iii., 1889), had disappeared, and the hollow in the tree which it had occupied had filled up, and grown out to such an extent that it was difficult to recognize the spot.

*Cecophylla smaragdina*, Fab.,

was found almost everywhere, and generally very common.

In the little island of Bolghetty, Cochin, it was very abundant, and I am inclined to think the workers averaged a larger size, and were deeper in colour (more of an orange tint) than the ordinary type from other parts of India.

Unfortunately much of this orange tinge is lost in the spirit bottle, and it may be only that the rich tropical scenery of that exquisitely beautiful spot lends a charm and depth of colouring even to the ants themselves ; but it would possibly be worth while for some future visitor to the Residency Bolghetty, with more time at his disposal, to make a thorough study of the merits in colour and size of its island *Cecophyllas*.

I have met with a very similar case with the yellow wasp (*Polistes hebræus*) in the Botanical Gardens, Calcutta, where a group of nests, for several seasons, certainly yielded finer and more deeply-coloured specimens than I have found elsewhere in India.

*Acropyga acutiventris*, Roger.

This is a poor little species, much like a small termite, or half-starved, immature *Lasius flavus*. I found a nest at Calicut in the roots of a partly-decayed tree, and at

Cochin (Bolghetty), established at the very bottom of my two best nests of *Odontomachus hæmatodes*, were little communities of this ant, ♀, ♂, and ♀; *hæmatodes* seemed to leave these tiny yellow visitors severely alone, and neither molested nor attended them.

In the evening swarms of the winged sexes came into the bath-room and put out the light (tel-butti); but these swarms must have come from some other establishments, as the colonies in my two nests of *hæmatodes* would not have furnished one per cent. of the foolish little ants who drowned themselves in the oil for three or four consecutive nights. This is the only instance in India where I have found one species living, not by, or near, or allied to, but bona-fide in the nest of another species.

*Plagiolepis longipes*, Jerdon.

This widely distributed species is very common in Southern India and along the Malabar Coast; but nowhere have I found it so abundant as in Calicut, where it strongly garrisons all the casuarina trees which grow near the big tank and public gardens, and it runs a fairly good second to *Solenopsis geminata* as *par excellence* the Calicut ant.

*Odontomachus hæmatodes*, L.

This species was very common in the Island of Bolghetty, Cochin; the nests were situated between the roots of trees, and several at the time of my visit, November 29th to December 4th, contained the winged sexes and were very populous; on opening up one of these, there would take place what can best be described as a display of ant-fireworks, the workers letting themselves off in showers with a distinct click, click, click, that could be heard without stooping down. But one or two nests that did not contain the sexes did not exhibit the same excitement and activity, and though there would be some little jumping going on there were no ant-fireworks.

Individual workers when taken from the nest, or still more so, stray workers when taken in hand, proved as a rule but indifferent jumpers, and often would not jump at all, but when they did, the action was exactly

as described by Mr. H. S. Ferguson, in "Our Ants," or as Mr. Wroughton concisely puts it in the same work when speaking of *Anochetus sedilotii*, "the action is distinctly that of a 'skip-jack' beetle, and not that of a grasshopper;" but the best *pas seul* is but a sorry performance, and to see and appreciate the really wonderful springing powers possessed by this ant, you must stir up a nest crowded with the winged sexes and ready to swarm.

I also found this species in Travancore, but the nests contained only workers, December 6th to 10th, and consequently there were no fireworks.

The click-click of *hæmatodes* is the only self-produced sound that, beyond the possibility of a doubt, I have met with amongst Indian ants.

*Anochetus sedilotii*, Emery, race *indicus*, Forel.

Bhavnagar, also a nest in the compound of the New Guest House, Baroda, where I found the workers hunting after sunset. I did not succeed in making them jump.

*Diacamma vagans*, Smith.

Mr. Wroughton does not mention this species as occurring in Bombay, but if anyone wishes to study this most interesting ant they can find her in the Victoria Gardens, hunting about the roots of some bamboo clumps which grow on the side of the gardens by the ornamental water.

*Diacamma geometricum*, Smith.

Common in Bolghetty, Cochin, several nests being established in the wall which surrounds the Residency kitchen garden; in ways and manners she is exactly like *vagans*.

*Ponera jerdonii*, Forel,

found in some numbers amongst the débris of stacks of firewood in Barrackpore, and also under the same conditions in the Botanical Gardens, Calcutta.

*Lobopelta chinensis*, Mayr.

This species is extremely common in Bangalore; armies march about the parade grounds and the polo ground, squadrons scour the drains which line the well-kept Cantonment roads, an immense army corps occupied a strong position in the big fernery of the Lall Bagh Gardens, the Station was literally garrisoned with *Lobopelta*, and I have no hesitation in saying that, in my very first afternoon in Bangalore, I saw ten times as many of these ants as I had in my previous fifteen years' residence in India.

With such splendid and unlooked-for opportunities, I was naturally very keen on the question of Sound or Stridulation, so every marching regiment, great or small, was subjected to the closest examination.

I poked and tickled them with a straw, with a stick; I interrupted their line of march with a brick and with my hand held edgewise; I stooped down and listened with my hand to my ear, till the ants swarmed all over me and down my neck; but not a sound, not a suspicion of a sound, could I get out of them. I tried similar experiments with an army in Mysore, and with one that frequented the compound of the Club, Trevandrum, but equally without success.

But now I come to my one possible exception; in the Museum Garden, Trevandrum, I met with, one Sunday evening (December 10th), a very fine army, which circled round and round the group of enclosures that contain wild pig and various species of deer. I repeated my regulation tactics of straws, sticks, and bricks, but with no better success. At last the army left the confines of the enclosure walls and headed into a dry drain or culvert, choked up with dry leaves; when well into this sunk way I interrupted the line of march, and then there was a wave of sound right along the line, a "roar" it might be called, perhaps, but a *feu de joie* by a long line of infantry better describes the impression left on my mind. This lasted only while the ants were travassing the leaf-choked way, for directly they struck the open path again no more sound could be obtained. Now the question is, did the ants produce this sound by any process of stridulating, or was it merely the warning of the interruption



flashed along the line in some way, causing an acceleration of pace and consequent hurried pattering of thousands of tiny feet on the dry leaves? It is quite certain the wave of sound went from the interruption to the head of the column and did not come from the rear, where the ants had not altered their pace, and it is equally certain that a break in the line invariably causes the ants to start off at the double-quick from that break to the head of the column, whilst the files in the rear surge up to the point of interruption, and are for the time thrown into more or less confusion. The result, even in this one instance, was disappointing, for the balance of evidence was certainly in favour of dry leaves and hurrying feet, rather than sound produced by stridulation.

*Lobopelta chinensis*, Mayr; var. *minchinii*, Forel,  
in litt., ♀ ♂.

I found a nest of this new variety under bricks in a culvert by the Tittaghur Bridge, Barrackpore Park; the males flew off when exposed, and the workers scampered away in all directions. I could not find a female, and no sound of any kind could be detected. I also took the same variety in Calicut.

*Dorylus oberthürrii*, Emery.

I found a very populous nest under bricks in the culvert by the Tittaghur Bridge, Barrackpore Park; it was close to (indeed the bricks were touching) the nest of *L. minchinii* var. above referred to. Amongst the ants were several small fresh-water crabs; some dead and half eaten, some dead and limp, but not eaten, and some alive and well. I could not find a female.

*Cataulacus latus*, Forel.

Bhavnagar, crawling about in the rough bark of a tree, keeping to the cracks and furrows, and looking much like the bark itself. I also found them in an exactly similar situation on a tree half-way up to Matheran, Bombay.

*Meranoplus rothneyi*, Forel, in litt.

This new species frequented the Residency compound, Bolghetty, Cochin, and could be found in some numbers running about the little patches of silver-sand which are dotted amongst the grass. A small species of *Mutilla* (*M. pusilla*, Smith) also frequents the same spots and mingles with the ants.

*Myrmecaria fodiens*, Jerdon,

is very common in Madras, Bangalore, and Cochin, and is everywhere a great constructor of earthworks; but in a grand old park-like compound in Madras, I came across a number of nests where the normal type thrown up round trees, posts, or against fences, was departed from, and seemingly in an exuberance of architectural skill and ambition.

*Myrmecaria* had developed three new and distinct forms of nest.

1. The Volcanic-cone shape.
2. The Dice-box shape.
3. The Tall-hat shape.

The dimensions in each case varied somewhat, but roughly ranged from a base of 12 to 14 inches diameter, and a height of 8 to 10 inches. All were situated quite clear of tree trunks, and some altogether in the open. The cone and dice-box shaped nests were very well built and nicely finished; the third form was somewhat irregular, but had a strong resemblance to the John Bull tall-hat, as we know it in the pages of "Punch," and it may be this shape was the outcome of the dice-box exaggerated and badly built; but it was curious how the fine granules of earth could be made to hold together in the curl-over which formed the brim.

The colony of *M. fodiens*, established under the big banyan-tree in Barrackpore Park, which is described in the Proc. Ent. Soc. (Feb. 24th, 1892), and also mentioned in "Our Ants," as being constantly under my notice from 1872 to 1886, I found still flourishing in January, 1894 (or presuming that no break had occurred between my last visit in March, 1886, and my next visit in January, 1894), showing a continuous residence in one spot of twenty-two years. I must say I fully expected to be disappointed in this instance, for as I approached my

favourite old haunt I found abundant evidence of a special cleaning and furbishing up for the benefit of the new Viceroy; the whole place had been freshly and heavily gravelled (soorkied) and rolled; the seats under the shade of the wide-spreading branches were radiant with new paint; everything had been done to make it attractive for Government House, but unpleasant for ants; but after a glance round—though for the time driven from the main-trunk—there were my old friends strongly established, and in force, round several of the smaller trunks and stems; under all these difficulties they had clung to their home, and the evidence of the attachment to this particular spot is the stronger from the fact that during my residence in India I had never found another nest of this ant in Barrackpore or its immediate neighbourhood. In all probability *fodiens* will hold her own in the same position for another score of years, and successfully brave the terrors of many a Vice-regal spring cleaning; or, indeed, there seems to be no reason why the colony should not last as long as the tree itself.

*Monomorium salomonis*, Lin., r. *indicum*, Forel, in litt.

This ant is one of the commonest and most widely-distributed in India, and she is generally a busy little harvester. A day spent in Poona enabled me to appreciate the force of Mr. Wroughton's remark, that "It would be quite safe to affirm that a specimen could be found within fifty yards of any spot in any grass land in the Poona districts."

It is fairly common in Madras; it is to be found all along the bullock-road from Nagarcoil to Tinnevely, and on all the railway stations from Tinnevely to Madras, and again from Lahore down to Delhi, Agra, Gwalior, Jhansi, Bhopal, as far as Itarsi, where I lost sight of her for the time. I did not find a specimen in Bombay or Calicut, in Cochin or Travancore, and in Calcutta and Barrackpore it is certainly rare; but in all these places *Solenopsis geminata* (v. *armata*) is either very common or swarms, and from this I am inclined to think that one species takes up the duties, whatever they may be, performed by the other, each in her own particular range, *salomonis* preferring a dry heat and a fiery soil, and *geminata* a moist, damp heat, with a rich earthy soil;



and though the ranges may overlap, and both species be found in force in one spot, as in Madras, yet on the whole they are fairly distinct, one species becoming less in evidence as the other comes to the front. I do not consider Bombay as exactly a typical locality for *Solenopsis*, and agree with Mr. Wroughton's suggestion that she has possibly been imported.

It was in Madras that I found *M. salomonis* turned to a practical use, and it is the first instance in my experience of ants being employed for commercial purposes. In the godowns of a large paper merchant—one V. Perumall Chetty—I was struck by the way the bales were stowed close to the ground, and enquired if they were not liable to constant danger from white ants. I spoke feelingly, for I have had painful experience of what can be done in this way in a Calcutta godown, and have seen, from the carelessness of a godown sircar, a line of thirty bales riddled in a couple of days. The reply to my enquiry was, "No, I never have any damage done, the little red ants come and keep them away, and sugar is scattered every morning or evening to ensure their regular attendance." I asked Mr. Chetty to collect me a bottle after a sugar-scattering, which he kindly did, sending me an immense number, the species being *M. salomonis*, 90 per cent., and *S. geminata* (*armata*), 10 per cent. (In Madras, *salomonis* is, I fancy, overpowering *geminata*.) I do not think I should feel disposed to discard my godown-horses, tar, and lime, in favour of friendly ants; but were I resident again in Calcutta, I should be tempted to see what *S. geminata* could do for me as an auxiliary precaution, and perhaps the hint may be worth the attention of others who have reams of paper to safeguard.

*Solenopsis geminata*, Fabr., v. *armata*, Forel.

Mr. Wroughton speaks of this species as the commonest ant in Bombay, and I can strongly endorse the fact; it is still more common in Calcutta and Barrackpore, and fairly common in Madras, but if you want to find it in overwhelming abundance go to Calicut, where it literally swarms. I do not think I have ever found any ant in such strong evidence anywhere else.

In the University Gardens, Bombay, I came across

two rather interesting nests formed round the trunks of palm trees, the roots of which were infested with a small Coccid. The ants heaped up their mounds to cover the parts so affected, and in places where these little Coccids were present well up on the trunk the ants had pushed their covered ways (which looked very like termite galleries) so as to reach and enclose them; some of these galleries were carried quite two feet up the trunk of the tree.

As described by Mr. Wroughton, *Solenopsis* is a strong harvester on the Western side, but I have not met with this trait in her in Bengal, the North-west Provinces or Madras (City).

*Pheidole rhombinoda*, Mayr.

I found some nests in Barrackpore Park, covered over in a perfect circle (taking the centre from the entrance, the circumference would equal about 10 to 12 inches), with the leaflets of some species of mimosa, but no leaflets were found in the nest itself on digging it up, and the even and umbrella-like appearance of the arrangement seems to suggest a protection against heat or rain, as the object the ants have in view.

In Madura, I came across a number of nests of a very curious and, to me, novel form.

The entrances were surrounded by little mounds arranged in a circle, composed of the dead bodies, or parts of bodies, of *Camponotus compressus* and *C. rufoglaucus*, but chiefly the big soldiers of *compressus*. There were heads alone, heads with the thorax attached, thorax without the head, bodies without thorax, with a scattering of legs and antennæ, attached and unattached, in every possible form, but I could not find any of these portions in the nests. Now the question arises, What are these mounds for, and how does *Pheidole* collect and form them? Are they simply carcasses stacked, to be cut up at leisure and carried into the nest in suitable sizes for future provision, or are these bodies arranged as a grim warning to prowling enemies, after the fashion of the skulls set up at the entrance to the villages of some wild and primitive tribe? and, then, how does *Pheidole* collect them? It is hardly possible that they are killed and brought in, for *Pheidole* would have to be in overwhelming force to master a single giant-

headed soldier of *compressus*. Perhaps they act as undertakers, and collect the dead thrown out by *Camponotus* for some special purpose of their own; and, then, why should this trait break out in Madura, for certainly I have not met with it in other parts, although *compressus* and *rhombinoda* are practically common everywhere.

These are the only two interesting forms of nest of *Pheidole* I have come across, but I have never had the good fortune to find *P. sykesii* and *P. wroughtonii*, the clever embankment builders which Mr. Wroughton so affectionately describes, nor have I found *Pheidole* in my travels a really strong harvester as *Holcomyrmea* everywhere is, as *M. salomonis* is in a lesser degree, and as *Solenopsis* undoubtedly is on the Western side of India, and but for the exhaustive observations Mr. Wroughton has made on this, his favourite genus, I should certainly have held *Pheidole's* harvesting powers in but poor repute instead of respecting her as the harvester *par excellence* of at least many parts of India.

*Cre mastogaster rogenhoferi*, Mayr.

I found a very fine nest in the compound of a bungalow at Bandora, near Bombay, and spent a long Sunday afternoon in trying to coax, worry and force the ants to stridulate, or make a sound of some kind or other. On disturbing the big brown-paper nest by tapping it with a stick the ants would swarm out in thousands, and a sound of some sort followed, but it did not suggest to me quite the hissing of a red-hot cinder plunged into water, as described by Mr. Wroughton in "Our Ants," but rather the pattering sound of many feet on the hollow nest, exactly as is met with when a nest of *Ecophylla smaragdina* is treated in the same way.

With more violent tapping and shaking, the ants began to fall in showers on to a fence and some shrubs beneath which produced the sound-effect of falling rain.

A large piece of the centre of the nest was then broken out, and the ants fell in numbers from the upper to the lower half, and this produced very excellent rain, more like the pattering of the early drops of a thunder shower (English, not Tropical), and this went on long after I had ceased to worry the nest. On the ground and on the fence beneath the nest the ants collected in

thousands, but as soon as the ant-rain from above ceased, no amount of persuasion or bullying could get a sound out of the crowds which were huddled together. As a check to any possible deafness on my part, I called in the assistance of a friend, not an entomologist, but a very keen observer (Mr. C. J. Barnes of Bombay), but he could not hear anything more than I did, and neither of us could detect anything beyond the pattering of ants on leaves, nest, or fence, and not a suspicion of a sound which could in any way be taken as independent and self-evolved.

*Cremastogaster* of several species I met with in numbers during my tour, and never missed an opportunity of experimenting, but without success; and the same with *Ecophylla*, disturb a nest of *Ec. smaragdina* and you will get the pattering, "red-hot cinder," or water-boiled-over sound, but take a crowded mass of *smaragdina* on tree-trunk or ground, irritate them with a stick, they will immediately show fight and literally sit-up at you, but without the nest, which acts as a drum, no sound do they produce.

*Cremastogaster* possesses stridulating apparatus, but *Ecophylla*, as Dr. Sharp points out, does not, yet the result is the same; disturb a nest and you get sound; disturb the ants without the nest, which acts as a drum, and you cannot.

#### *Sima nigra*, Jerdon.

The nest referred to in "Notes on Indian Ants" (Trans. Ent. Soc. iii., 1889), situated in the drive between Government House and the Outram Statue, Calcutta, I found in a most flourishing condition, and the number of ants apparently increased with the size of the tree, which was very considerable; this is the second instance of a particular nest, well known to me from 1872 to 1886, found still strong and vigorous in 1894, or a continuous residence of twenty-two years.

There was a nest of this species in the Victoria Gardens, Bombay, and present with the ants the mimicking *Salticus*, exactly as on the Bengal side.

#### *Sima rufo-nigra*, Jerdon.

My two well-known nests (1872-1886) in Barrackpore Park were, in 1894, extinct. One tree had disappeared

altogether, and the other had grown to such an extent as to be hardly recognizable, and the hole in which the nest was situated had filled up and bulged out; but had these nests been in existence they would not have afforded the same test of continued residence as the much rarer and more highly localized species *S. nigra* and *M. fodiens*.

I do not think *rufo-nigra* is a common ant in Bombay; but should anyone wish to find her, there are one or two nests in the Victoria Gardens.

#### SOUND.

I started on my tour with the full determination of making ants stridulate if I possibly could; but in spite of this bias and exceptional opportunities of observation afforded by at least *Lobopelta*, I must confess myself altogether disappointed, for, with the exception of the click, click, of the jumping *hæmatodes*, I failed to detect any sound which could be considered self-evolved; but because I failed I do not for one moment suggest that ants cannot and do not stridulate so as to be audible by human ears. Dr. Sharp in his very interesting paper (Trans. Ent. Soc. ii., 1893) has amply proved that they possess the means. Mr. Aitken is perfectly certain as to *Lobopelta*, and Mr. Wroughton, though not quite so strong in his faith, is still a believer in *Cremastogasters'* powers ("Our Ants," pp. 15, 16), and such accurate observers are not likely to be mistaken.

The moral I should like to advance is, that you cannot make ants do what you wish, and when you wish, they won't play if they do not want to; and I feel convinced this spirit enters largely into ant life, and will account for many apparent discrepancies in observations of their habits. Ants, or at least Indian ants, are so clever that they will not be bound by hard and fast lines but require a certain latitude for variation of polity. I ventured to suggest this theory in my former notes (Trans. Ent. Soc. iii., 1889, p. 347), and I now feel more strongly than ever, that in laying down rules for ant conduct, some allowance should always be made for the different little traits of character, the whims and fancies, as it were, which are to be found, not only in a given species but in individual ants.



I append a table giving the names, localities, and dates of capture of the collection, not in any way as a list of the species to be found, but as a record of those ants most in evidence during the limited period of the tour. Many of Dr. Forel's names are still in MS.; as his great work, "Les Formicides de l'Empire des Indes et de Ceylan," which is appearing in the Transactions of the Bombay Natural History Society, and which must be the standard work on Indian Ants for all time, is nearing at the present date the completion of the Dolichoderidæ:—

TABLE OF SPECIES, LOCALITIES, AND DATES.

| SPECIES.                          | Bombay City. | Bombay. | Vihar, Bombay. | Madras. | Bangalore. | Mysore. | Calicut. | Cochin. | Travancore. | Madura. | Barrackpore. | Delhi. | Bhavnagar. | Mussorie. |
|-----------------------------------|--------------|---------|----------------|---------|------------|---------|----------|---------|-------------|---------|--------------|--------|------------|-----------|
| CAMPONOTIDÆ.                      |              |         |                |         |            |         |          |         |             |         |              |        |            |           |
| <i>Camponotus sericeus</i> , Fab. | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>v. opaciventris</i> , Mayr   | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>radiatus</i> , Forel         | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>angusticollis</i> , Jerdon   | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>ryfoglaucus</i> , Jerd.      | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>v. paria</i> , Emery         | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>v. redtenbacheri</i> , Mayr. | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>v. dolendus</i> , Forel      | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>compressus</i> , Fab.        | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>taylori</i> , Forel          | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>infuscus</i> , Forel         | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>maculatus</i> , Fab.         | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>v. mitis</i> , Sm.           | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
| " <i>v. fuscithorax</i> , Forel   | ..           | ..      | ..             | ..      | ..         | ..      | ..       | ..      | ..          | ..      | ..           | ..     | ..         | ..        |
|                                   |              |         |                | ♂       |            |         |          | ♂       |             | ♂       |              | ♂      |            | ♂         |
|                                   |              |         |                | ♀       |            |         |          | ♀       |             | ♀       |              | ♀      |            | ♀         |
|                                   |              |         |                | ♂       |            |         |          | ♂       |             | ♂       |              | ♂      |            | ♂         |
|                                   |              |         |                | ♀       |            |         |          | ♀       |             | ♀       |              | ♀      |            | ♀         |
|                                   |              |         |                | ♂       |            |         |          | ♂       |             | ♂       |              | ♂      |            | ♂         |
|                                   |              |         |                | ♀       |            |         |          | ♀       |             | ♀       |              | ♀      |            | ♀         |
|                                   |              |         |                | ♂       |            |         |          | ♂       |             | ♂       |              | ♂      |            | ♂         |
|                                   |              |         |                | ♀       |            |         |          | ♀       |             | ♀       |              | ♀      |            | ♀         |
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